

REMARKS

I. Status of the Application

Claims 1-22 are pending in this application. Claims 16-22 have been withdrawn in accordance with an election referenced in page 3 of the December 3, 2004 office action. In the December 3, 2004 office action, the Examiner:

A. Claimed that no Information Disclosure Statement had been filed as of the date of the office action;

B. Requested cooperation in correcting errors in the specification and claims due to a translation into English from a foreign document;

C. Rejected claim 12 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite; and

D. Rejected claims 1-15 under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 4,881,885 to Kovac et al. (hereinafter "Kovac").

In this response, applicant has amended claims 1-11 and 13-14, and have canceled claims 12 and 15, without prejudice. Applicant respectfully traverses the rejection of claims and requests reconsideration in view of the foregoing amendments and the following remarks.

II. Clarification on Information Disclosure Statement

It is respectfully submitted that an information disclosure statement had been filed and indeed received by the U.S. Patent and Trademark prior to the mailing date of the December

3, 2004 office action. In particular, an Information Disclosure Statement was filed in this case on October 14, 2004. The OIPE of the U.S. Patent and Trademark Office acknowledged receipt of the Information Disclosure Statement on October 18, 2004, according to the return postcard received by Applicants' attorney.

III. The Translation of the Specification

The Examiner requested the cooperation of applicant (i.e. applicants' attorney) in correcting errors in the specification due to the translation of the foreign language specification. Applicant appreciates the Examiner's understanding in this matter. Amendments to this end have been provided herein. If there additional problem areas not addressed by the amendments, the Examiner is respectfully requested to identify them and additional amendments will be made.

IV. The Indefiniteness Rejection of Claim 12 is in Error

The Examiner has rejected claim 12 as being indefinite. Claim 12 has been canceled, without prejudice. Accordingly, it is respectfully submitted that the indefiniteness rejection of claim 12 is moot.

V. Claim 1 is Patentable Over Kovac

In the December 3, 2004 office action, the Examiner rejected claim 1 as being allegedly being obvious over Kovac. For reasons discussed below in detail, it is respectfully submitted that claim 1 is allowable over Kovac. Kovac, fails to disclose, among other things, a chip mechanically fixed to an interconnect layer, as claimed. Kovac also fails to teach a

bonding channel in which encapsulation material is arranged. Moreover, because Kovac is directed to a completely different structure and application, there is no motivation or suggestion to modify Kovac to overcome either or both of these deficiencies. Accordingly, claim 1 is patentable over Kovac.

A. The Present Invention

Claim 1 is directed to A package that includes a supporting substrate, an interconnect layer, a chip, an encapsulation material, and an escape prevention structure. The supporting substrate has a bond opening therein. The interconnect layer is disposed on the supporting substrate and includes a bonding channel that overlaps with the bond opening. The chip is mechanically fixed to the interconnect layer to cover the bonding channel. The encapsulation material is arranged in the bonding channel. The escape prevention structure enables escaping of air from the bonding channel and substantially prevents the encapsulation material from escaping from the bonding channel.

B. Kovac

Kovac relates to an apparatus that encapsulates a surface and leads of a chip. The apparatus includes a fixture for holding the chip. The fixture includes a recessed well 14 into which the chip is placed. The chip 24 is held within the well by a vacuum applied to the backside of the chip. The Kovac apparatus includes conduits 20 that restrict the overflow of the coating material as a consequence of a combination of factors. The three factors include the rapid removal of solvent from the coating, the rapid formation of skin of crosslinked material, and a momentum balance between the coating deposition rate and air flow. The

finished product of Kovac is removed from the fixture, and is illustrated in Fig. 5.

C. Kovac Does Not Teach or Suggest a Mechanically
Fixing the Chip on the Interconnect Layer

Kovac fails to teach or suggest a chip that is mechanically fixed to the interconnect layer that is on the supporting substrate. Instead, Kovac teaches the use of a vacuum to temporarily hold the chip against the “interconnect layer” fixture 12. As is known in the art, “mechanically fixing” an object to another is not the same as employing a temporary vacuum to retain one object against another.

Moreover, the Examiner does not allege that it would have been obvious to mechanically fix the chip of Kovac to its fixture 12. The fixture 12 of Kovac is a work fixture on which a chip is placed to be processed or worked. It does not constitute a part of the finished structure. By contrast, the present invention is directed to a package that includes the interconnect layer *and* the chip, thereby making it important to have a mechanical affixation (i.e. a connection that does not require ongoing energy consumption to sustain the connection), whereas a temporary work support may readily benefit from a vacuum to draw and hold the chip temporarily.

Thus, one of ordinary skill in the art would not be motivated to modify Kovac to remove the vacuum channels and structures and replace those with a device that mechanically fixes the chip to the Kovac fixture because the end goal of Kovac is different from that of the present invention. In Kovac, the fixture is not to be a part of the final product.

D. Kovac Does Not Teach or Suggest a Bonding
Channel in Which Encapsulation Material is Arranged

The Examiner has alleged that Kovac includes a bonding channel overlapping with a bonding opening. In particular, the Examiner alleges that the vacuum port 16 constitutes the bonding opening, and that bonding channel is generally taught at column 4, lines 4-6. The cited passages are as follows

The openings 20, as illustrated in FIG. 3 are all coupled to a common manifold 22 channeled in the block 10 which recess air from an air source, not illustrated.

(Kovac at col. 4, lines 4-6). Those passages do not suggest a “bonding channel” at all, but merely an “air” manifold for the vacuum and exhaust system. In addition, to the extent such a manifold could be considered to be a bonding channel, it clearly does *not* ever have encapsulation material arranged or disposed therein. In particular, as shown in Figs. 3 and 4 of Kovac, the encapsulating material 42 is specifically isolated *from* the openings 20 and the manifold 22. The encapsulating material is *prevented* from entering the openings and manifold 22 by the chip 24 itself and the terminals 26 and 28. (See Figs. 3&4).

Moreover, there is no motivation or suggestion to place encapsulating material on with the vacuum and air manifolds under the chip 24 of Kovac because it would appear to render the entire device unusable.

In any event, it is respectfully submitted that Kovac neither teaches nor suggests a bonding channel, in the arrangement as claimed, wherein an encapsulation material arranged in the bonding channel.

E. Conclusion as to Claim 1

For multiple independent reasons discussed above, as well as others, Kovac fails to teach or suggest all the elements of claim 1. Therefore, it is respectfully submitted that the

obviousness rejection of claim 1 over Kovac is in error and should be withdrawn.

VI. Claims 2-11 and 13-15

Claims 2-11 and 13-15 also stand rejected as allegedly being obvious over Kovac.

Claims 2-11 and 13-15 depend from and incorporate all of the limitations of claim 1.

Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claims 2-11 and 13-15 over Kovac should be withdrawn.

VII. Conclusion

For all of the foregoing reasons, it is respectfully submitted the applicants have made a patentable contribution to the art. Favorable reconsideration and allowance of this application is, therefore, respectfully requested.

Respectfully submitted,



Harold C. Moore
Attorney for Applicants
Attorney Registration No. 37,892
Maginot Moore & Beck
Bank One Center Tower
111 Monument Circle, Suite 3000
Indianapolis, Indiana 46204-5115
Telephone: (317) 638-2922